

- (1) Determine whether the following numbers are real or non-real. If real, indicate whether the number is rational or irrational:

- | | |
|----------------------|---------------------|
| (a) 7 | (b) $-\sqrt{3}$ |
| (c) π | (d) $\sqrt{-16}$ |
| (e) $0, \dot{3}$ | (f) $\frac{12}{36}$ |
| (g) $\sqrt[3]{-125}$ | (h) $1 + \sqrt{9}$ |
| (i) $\sqrt{(-2)^3}$ | (j) 0 |

- (2) State whether the following statements are true or false:

- (a) The product of two integers is always an integer again.
- (b) The product of two irrational numbers is always an irrational number.
- (c) If m is a natural number, then $\sqrt{4m}$ will also be a natural number.
- (d) The difference between two rational numbers is always a rational number.
- (e) The quotient of a rational number and an irrational number will always be rational.

- (3) For which values of x will the following statements be:

(i) undefined (ii) non-real

(a) $\frac{x + 3}{x}$

(b) $\sqrt{x - 1}$

(c) $\frac{\sqrt{x}}{x + 2}$

- (4) Given: $P = \sqrt[4]{3y} - 1$. To which of the following number system(s) would P belong if:

[Number systems: $\mathbb{N}$; $\mathbb{N}_0$; $\mathbb{Z}$; $\mathbb{Q}$; $\mathbb{Q}'$; $\mathbb{R}$ or $\mathbb{R}'$]

(a) $y = \frac{1}{3}$

(b) $y = -1$

(c) $y = 5$